

# Bahan Ajar

## 1. Serangga air: Pendahuluan

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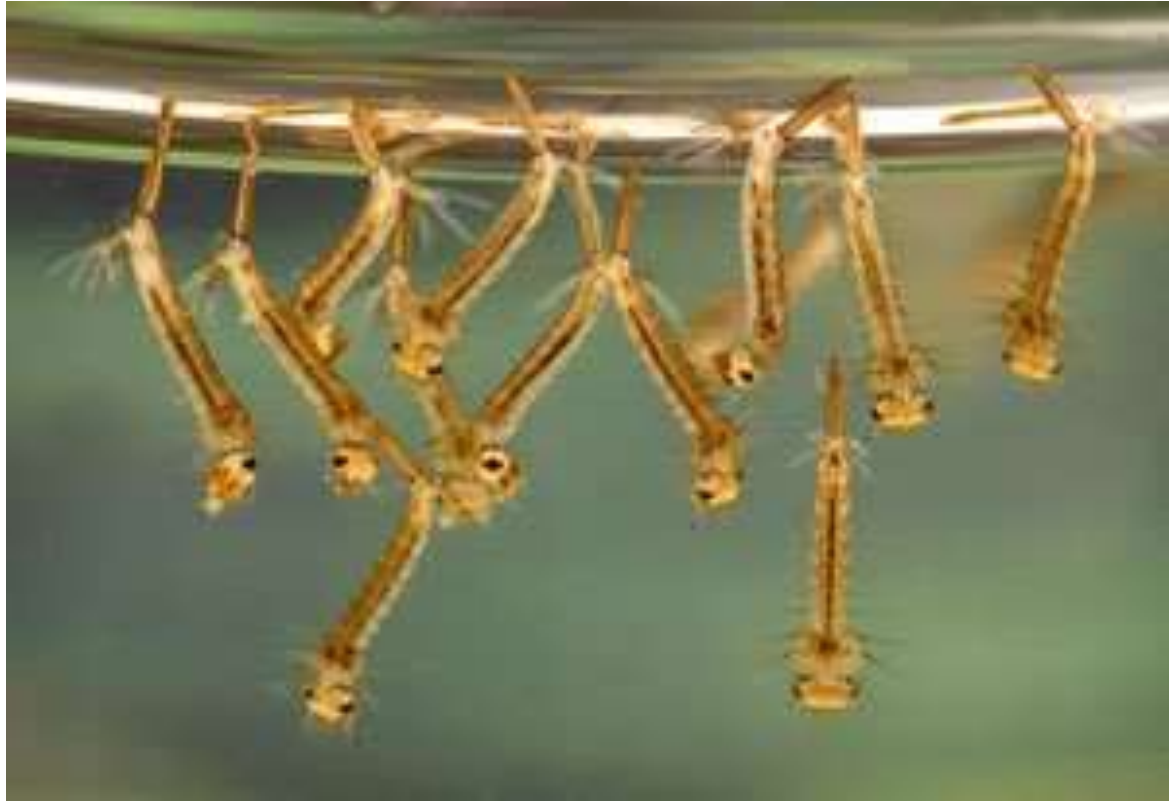
Avertebrata Akuatik (SKS: 3)



**Serangga air ?????**











*Mayflies*  
Ephemeroptera



*Stoneflies*  
Plecoptera



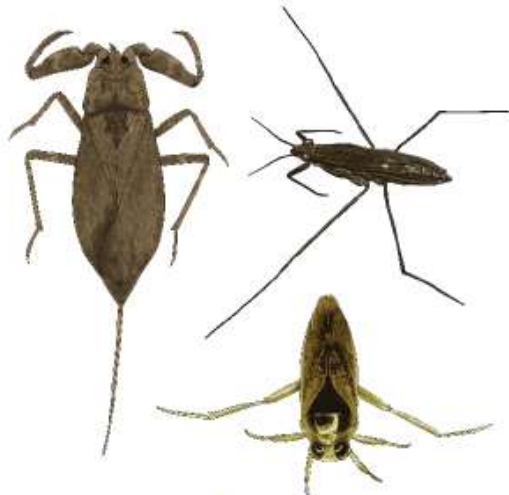
*Caddisflies*  
Trichoptera



*Dragons & damsels*  
Odonata



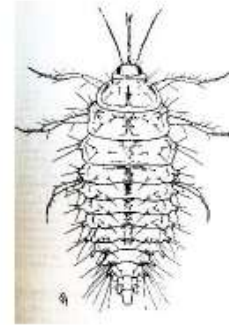
*Beetles*  
Coleoptera



*True bugs*  
Hemiptera



*True flies*  
Diptera



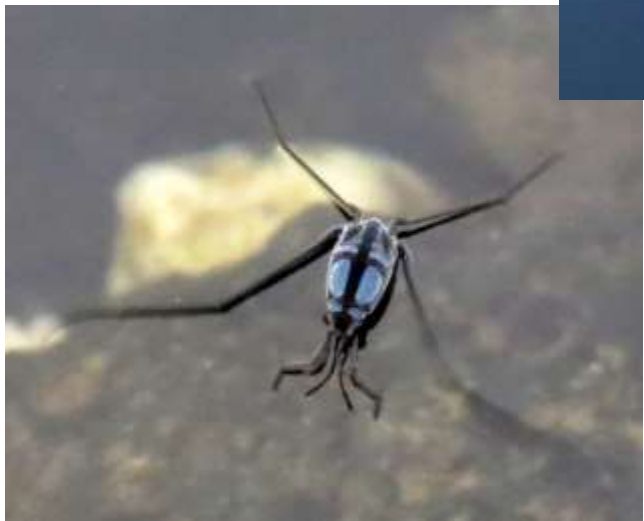
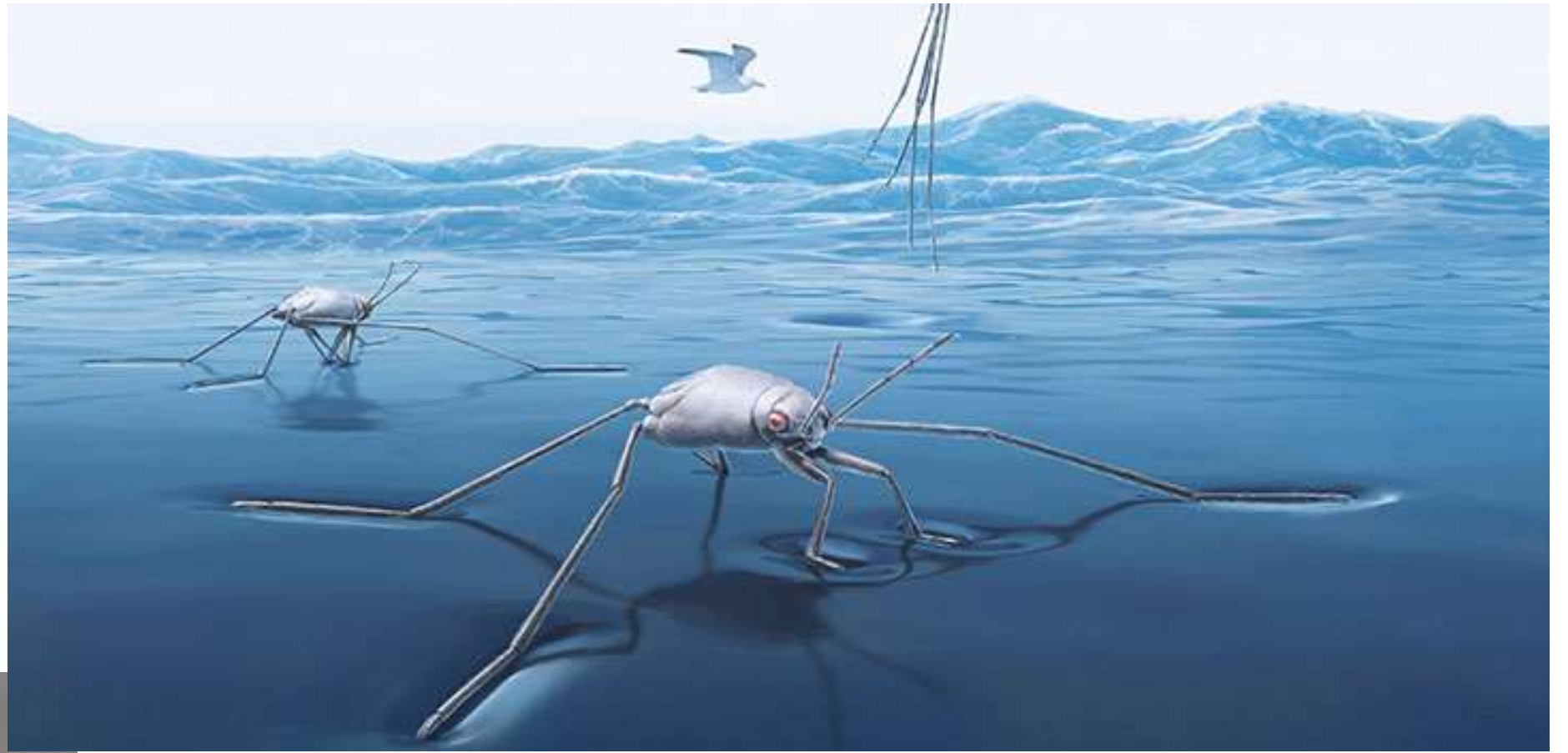
*The "minor orders"*  
Megaloptera, Neuroptera, Lepidoptera

# Habitat: lentik dan lotik sistem









# Ephemeroptera

>3000 species



# Plecoptera

~4000 species



*Mesocapnia arizonensis*, Santa Rita Mountains, AZ

# Trichoptera

>14,000 species



*Neophylax rickeri*, Point Reyes NS, California

# Odonata

>6000 species

*Paltothemis lineatipes*  
Dragon Mountains, AZ



# Coleoptera

>19,000 species



*Thermonectus marmoratus*  
Ventana Canyon, AZ

# Hemiptera

>5000 species



*Abedus herberti*, Cave Creek, AZ



# Diptera

>20,000 species



*Prosimulium* sp.  
Willow Creek, AZ



Photo: [www.troutnut.com](http://www.troutnut.com)

# Lepidoptera

~1000 species



Photo: D. Rubinoff

# Megaloptera

~400 species



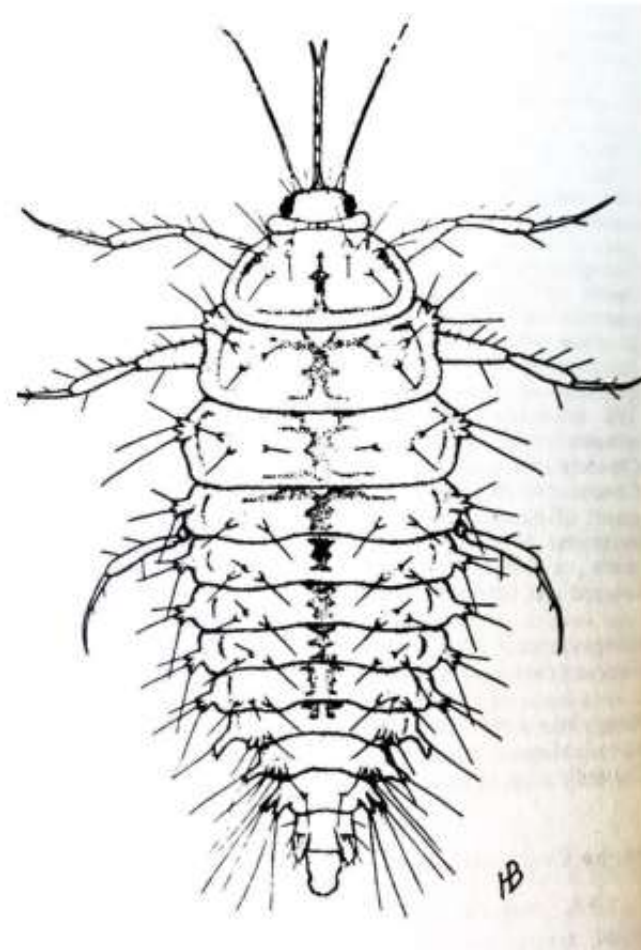
*Corydalus texanus*  
Bear Canyon, AZ



Sierra El Aguaje, Sonora

# Neuroptera

>100 species



Did insects colonize aquatic habitats  
once or multiple times?

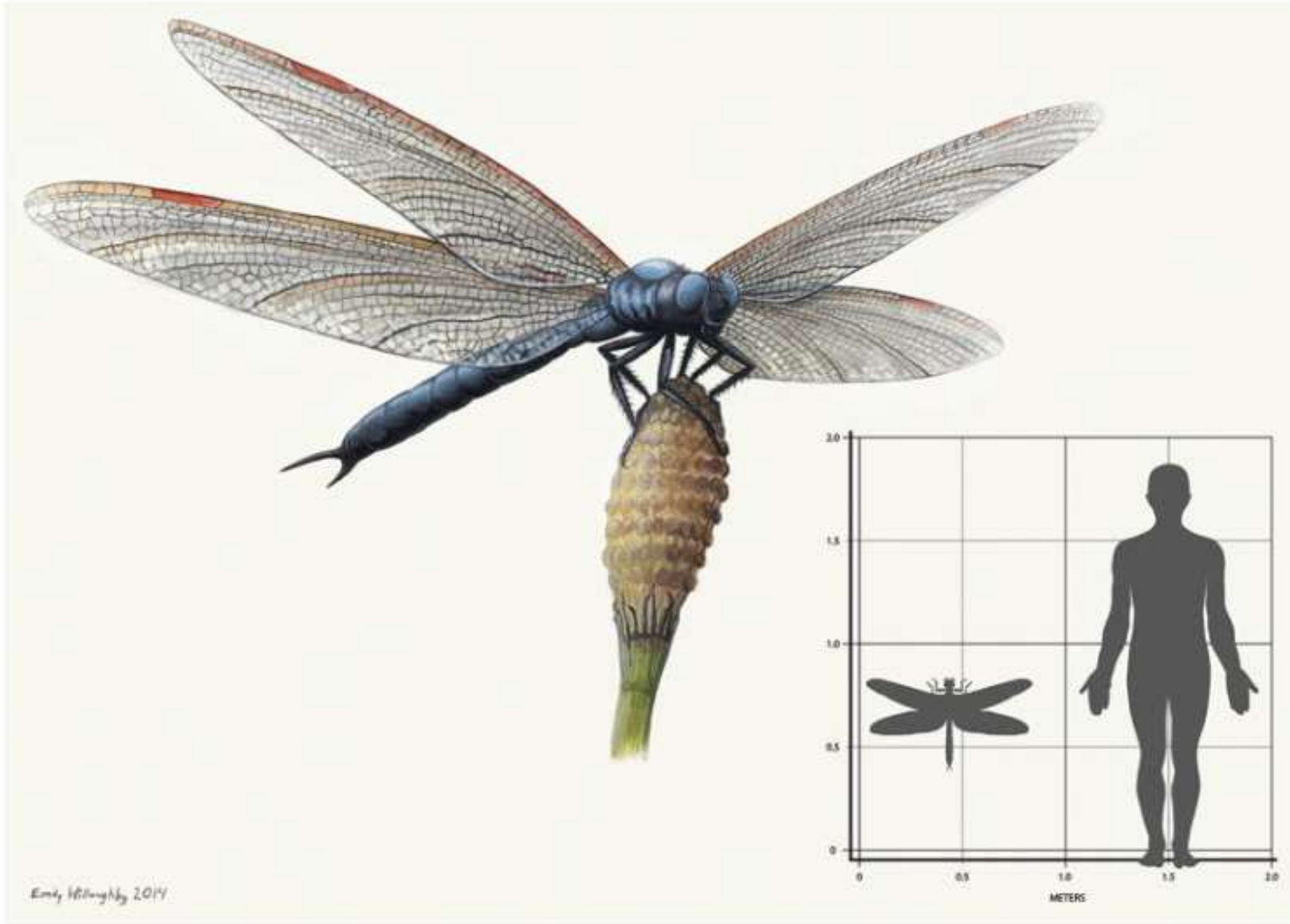


*Some orders fully aquatic, others have mix of terrestrial and aquatic species*

Sudah berapa lama serangga air hidup di bumi????



*Meganeura* Jurassic Period



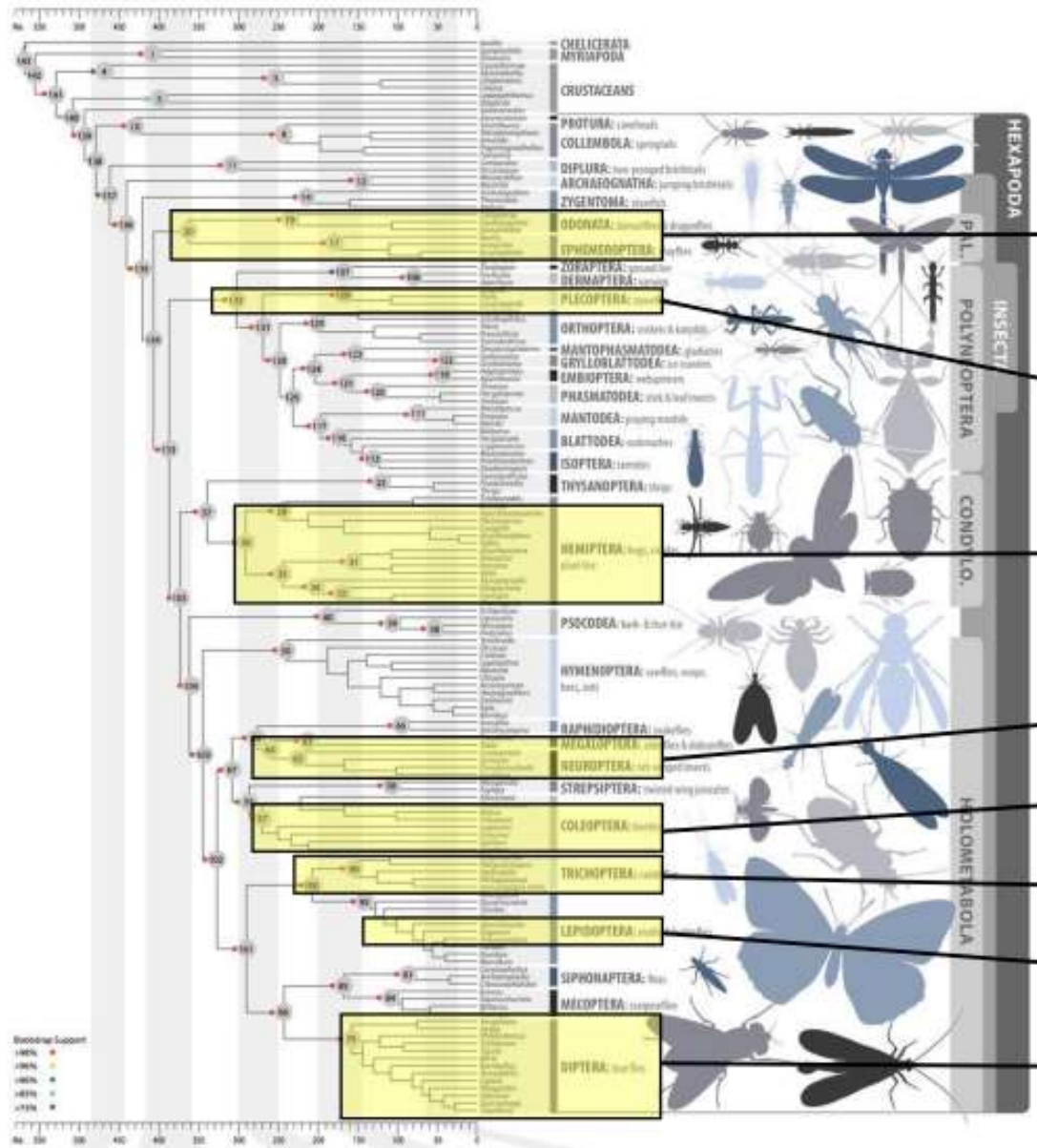
The wingspan is 68cm



The Virtual Fossil Museum  
[www.fossilmuseum.net](http://www.fossilmuseum.net)

Mayfly, Cretaceous period, Brazil





Dragonflies  
Mayflies

Stoneflies

True bugs

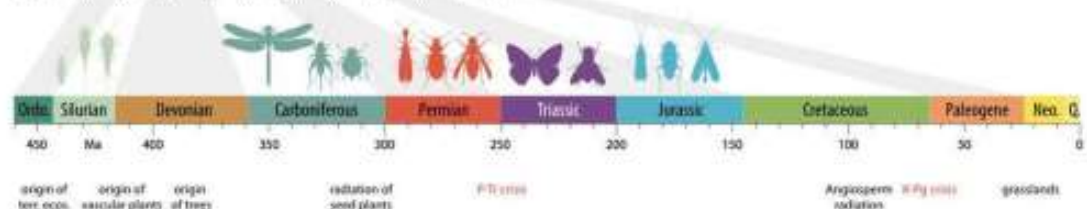
Dobsonflies, lacewings

Beetles

Caddisflies

Aquatic moths

True flies



419.2 (+/- 3.2) million years ago - 358.9 (+/- 0.4) million years ago

# Era Devonian



